reciprocity to podiatrists who are licensed in another State. Most States require continuing education for licensure renewal.

Prerequisites for admission to a college of podiatric medicine include the completion of at least 90 semester hours of undergraduate study, an acceptable grade point average, and suitable scores on the Medical College Admission Test (MCAT). All require 8 semester hours each of biology, inorganic chemistry, organic chemistry, and physics, and 6 hours of English. The science courses should be those designed for pre-medical students. Potential podiatric medical students may also be evaluated on the basis of extracurricular and community activities, personal interviews, and letters of recommendation. Over 90 percent of podiatric students have at least a bachelor's degree.

Colleges of podiatric medicine offer a 4-year program whose core curriculum is similar to that in other schools of medicine. During the first 2 years, students receive classroom instruction in basic sciences, including anatomy, chemistry, pathology, and pharmacology. Third- and fourth-year students have clinical rotations in private practices, hospitals, and clinics. During these rotations, they learn how to take general and podiatric histories, perform routine physical examinations, interpret tests and findings, make diagnoses, and perform therapeutic procedures. Graduates receive the doctor of podiatric medicine (DPM) degree.

Most graduates complete a hospital residency program after receiving a DPM. Residency programs last from 1 to 3 years. Residents receive advanced training in podiatric medicine and surgery and serve clinical rotations in anesthesiology, internal medicine, pathology, radiology, emergency medicine, and orthopedic and general surgery. Residencies lasting more than 1 year provide more extensive training in specialty areas.

There are a number of certifying boards for the podiatric specialties of orthopedics, primary medicine, or surgery. Certification means that the DPM meets higher standards than those required for licensure. Each board requires advanced training, completion of written and oral examinations, and experience as a practicing podiatrist. Most managed care organizations prefer board-certified podiatrists.

People planning a career in podiatry should have scientific aptitude, manual dexterity, interpersonal skills, and good business sense.

Podiatrists may advance to become professors at colleges of podiatric medicine, department chiefs of hospitals, or general health administrators.

**Job Outlook**

Employment of podiatrists is expected to grow about as fast as the average for all occupations through 2008. More people will turn to podiatrists for foot care as the elderly population grows. The elderly have more years of wear and tear on their feet and legs than most younger people, so they are more prone to foot ailments. Injuries sustained by an increasing number of men and women of all ages leading active lifestyles will also spur demand for podiatric care.

Medicare and most private health insurance programs cover acute medical and surgical foot services, as well as diagnostic x rays and leg braces. Details of such coverage vary among plans. However, routine foot care—including the removal of corns and calluses—is ordinarily not covered, unless the patient has a systemic condition that has resulted in severe circulatory problems or areas of desensitization in the legs or feet. Like dental services, podiatric care is more dependent on disposable income than other medical services.

Employment of podiatrists would grow even faster were it not for continued emphasis on controlling the costs of specialty health care. Insurers will balance the cost of sending patients to podiatrists against the cost and availability of substitute practitioners, such as physicians and physical therapists. Opportunities will be better for board-certified podiatrists, because many managed care organizations require board-certification. Opportunities for newly trained podiatrists will be better in group medical practices, clinics, and health networks than in a traditional solo practice. Establishing a practice will be most difficult in the areas surrounding colleges of podiatric medicine because podiatrists are concentrated in these locations.

Over the next 10 years, members of the "baby boom" generation will begin to retire, creating vacancies. Relatively few job openings from this source are expected, however, because the occupation is small.

**Earnings**

Median annual earnings of salaried podiatrists were $79,530 in 1998. However, only about one-half of podiatrists were salaried in 1998. Salaried podiatrists tend to earn less than self-employed podiatrists.

According to a survey by the American Podiatric Medical Association, average net income for podiatrists in private practice was about $116,000 in 1997. Those practicing for less than 2 years earned an average of about $61,000; those practicing 16 to 30 years earned an average of about $146,000.

**Related Occupations**

Workers in other occupations who apply scientific knowledge to prevent, diagnose, and treat disorders and injuries are chiropractors, dentists, optometrists, physicians, and veterinarians.

**Sources of Additional Information**

For information on podiatric medicine as a career, contact:

☛ American Podiatric Medical Association, 9312 Old Georgetown Rd., Bethesda, MD 20814-1621. Internet: **http://www.apma.org**

Information on colleges of podiatric medicine, entrance requirements, curriculums, and student financial aid is available from:

☛ American Association of Colleges of Podiatric Medicine, 1350 Piccard Dr., Suite 322, Rockville, MD 20850-4307.
Internet: **http://www.aacpm.org**

## Veterinarians

(O*NET 32114A, 32114B, and 32114C)

**Significant Points**

- Graduation from an accredited college of veterinary medicine and a license to practice are required.
- Competition for admission to veterinary school is keen.

**Nature of the Work**

Veterinarians play a major role in the health care of pets, livestock, and zoo, sporting, and laboratory animals. Some veterinarians use their skills to protect humans against diseases carried by animals and conduct clinical research on human and animal health problems. Others work in basic research, broadening the scope of fundamental theoretical knowledge, and in applied research, developing new ways to use knowledge.

Most veterinarians perform clinical work in private practices. More than one-half of these veterinarians predominately, or exclusively, treat small animals. Small animal practitioners usually care for companion animals, such as dogs and cats, but also treat birds, reptiles, rabbits, and other animals that can be kept as pets. Some veterinarians work in mixed animal practices where they see pigs, goats, sheep, and some nondomestic animals, in addition to companion animals. Veterinarians in clinical practice diagnose animal health problems; vaccinate against diseases, such as distemper and rabies; medicate animals suffering from infections or illnesses; treat and dress wounds; set fractures; perform surgery; and advise owners about animal feeding, behavior, and breeding.

A small number of private practice veterinarians work exclusively with large animals, focusing mostly on horses or cows but may also care for various kinds of food animals. These veterinarians usually drive to farms or ranches to provide veterinary services for herds or individual animals. Much of this work involves preventive care to maintain the health of the food animals. These veterinarians test for and vaccinate against diseases and consult with farm or ranch owners and managers on animal production, feeding, and housing issues. They also treat and dress wounds, set fractures, and perform surgery—including cesarean sections on birthing animals. Veterinarians also euthanize animals when necessary. Other veterinarians care for zoo, aquarium, or laboratory animals.

Veterinarians who treat animals use medical equipment, such as stethoscopes; surgical instruments; and diagnostic equipment, such as radiographic and ultra-sound equipment. Veterinarians working in research use a full range of sophisticated laboratory equipment.

Veterinarians can contribute to human as well as animal health. A number of veterinarians work with physicians and scientists as they research ways to prevent and treat human health problems, such as cancer, AIDS, and alcohol or drug abuse. Some determine the effects of drug therapies, antibiotics, or new surgical techniques by testing them on animals.

Some veterinarians are involved in food safety at various levels. Veterinarians who are livestock inspectors check animals for transmissible diseases, advise owners on treatment, and may quarantine animals. Veterinarians who are meat, poultry, or egg product inspectors examine slaughtering and processing plants, check live animals and carcasses for disease, and enforce government regulations regarding food purity and sanitation.

**Working Conditions**

Veterinarians often work long hours, with one-third of full-time workers spending 50 or more hours on the job. Those in group practices may take turns being on call for evening, night, or weekend work; and solo practitioners can work extended and weekend hours, responding to emergencies or squeezing in unexpected appointments.

Veterinarians in large animal practice also spend time driving between their office and farms or ranches. They work outdoors in all kinds of weather, and have to treat animals or perform surgery under less-than-sanitary conditions. When working with animals that are frightened or in pain, veterinarians risk being bitten, kicked, or scratched.

Veterinarians working in non-clinical areas, such as public health and research, have working conditions similar to those of other professionals in those lines of work. In these cases, veterinarians enjoy clean, well-lit offices or laboratories and spend much of their time dealing with people rather than animals.

*A veterinarian checks a pet's vision.*

**Employment**

Veterinarians held about 57,000 jobs in 1998. About 30 percent were self-employed in solo or group practices. Most others were employees of another veterinary practice. The Federal Government employed about 1,900 civilian veterinarians, chiefly in the U.S. Department of Agriculture, and about 400 military veterinarians in the U.S. Army and U.S. Air Force. Other employers of veterinarians are State and local governments, colleges of veterinary medicine, medical schools, research laboratories, animal food companies, and pharmaceutical companies. A few veterinarians work for zoos; but most veterinarians caring for zoo animals are private practitioners who contract with zoos to provide services, usually on a part-time basis.

**Training, Other Qualifications, and Advancement**

Prospective veterinarians must graduate from a 4-year program at an accredited college of veterinary medicine with a Doctor of Veterinary Medicine (D.V.M. or V.M.D.) degree and obtain a license to practice. There are 27 colleges in 26 States that meet accreditation standards set by the Council on Education of the American Veterinary Medical Association. The prerequisites for admission vary by veterinary medical college. Many of these colleges do not require a bachelor's degree for entrance; but all require a significant number of credit hours—ranging from 45 to 90 semester hours—at the undergraduate level. However, most of the students admitted have completed an undergraduate program.

Preveterinary courses emphasize the sciences; and veterinary medical colleges typically require classes in organic and inorganic chemistry, physics, biochemistry, general biology, animal biology, animal nutrition, genetics, vertebrate embryology, cellular biology, microbiology, zoology, and systemic physiology. Some programs require calculus; some require only statistics, college algebra and trigonometry, or precalculus; and others require no math at all. Most veterinary medical colleges also require core courses, including some in English or literature, the social sciences, and the humanities.

Most veterinary medical colleges will only consider applicants who have a minimum grade point average (GPA). The required GPA varies by school, from a low of 2.5 to a high of 3.2, based on a maximum GPA of 4.0. However, the average GPA of candidates at most schools is higher than these minimums. Those who receive offers of admission usually have a GPA of 3.0 or better.

In addition to satisfying preveterinary course requirements, applicants must also submit test scores from the Graduate Record Examination (GRE), the Veterinary College Admission Test (VCAT), or the Medical College Admission Test (MCAT), depending on the preference of each college.

Additionally, in the admissions process, veterinary medical colleges weigh heavily a candidate's veterinary and animal experience. Formal experience, such as work with veterinarians or scientists in clinics, agribusiness, research, or in some area of health science, is particularly advantageous. Less formal experience, such as working with animals on a farm or ranch or at a stable or animal shelter, is also helpful. Students must demonstrate ambition and an eagerness to work with animals.

Competition for admission to veterinary school is keen. The number of accredited veterinary colleges has remained at 27 since 1983, whereas the number of applicants has risen. About 1 in 3 applicants was accepted in 1998. Most veterinary medical colleges are public, State-supported institutions and reserve the majority of their openings for in-state residents. Twenty-one States that do not have a veterinary medical college agree to pay a fee or subsidy to help cover the cost of veterinary education for a limited number of their residents at one or more out-of-state colleges. Nonresident students who are admitted under such a contract may have to pay out-of-state tuition, or they may have to repay their State of residency all, or part, of the subsidy provided to the contracting college. Residents

of the remaining 3 States (Connecticut, Maine, and Vermont) and the District of Columbia may apply to any of the 27 veterinary medical colleges as an *at-large* applicant. The number of positions available to at-large applicants is very limited at most schools, making admission difficult.

While in veterinary medical college, students receive additional academic instruction in the basic sciences for the first 2 years. Later in the program, students are exposed to clinical procedures, such as diagnosing and treating animal diseases and performing surgery. They also do laboratory work in anatomy, biochemistry, medicine, and other scientific subjects. At most veterinary medical colleges, students who plan a career in research can earn both a D.V.M degree and a Doctor of Philosophy (Ph.D.) degree at the same time.

Veterinary graduates who plan to work with specific types of animals or specialize in a clinical area, such as pathology, surgery, radiology, or laboratory animal medicine, usually complete a 1-year internship. Interns receive a small salary but usually find that their internship experience leads to a higher beginning salary, relative to other starting veterinarians. Veterinarians who seek board certification in a specialty must also complete a 2- to 3-year residency program that provides intensive training in specialties, such as internal medicine, oncology, radiology, surgery, dermatology, anesthesiology, neurology, cardiology, ophthalmology, and exotic small animal medicine.

All States and the District of Columbia require that veterinarians be licensed before they can practice. The only exemptions are for veterinarians working for some Federal agencies and some State governments. Licensing is controlled by the States and is not strictly uniform, although all States require successful completion of the D.V.M. degree—or equivalent education—and passage of a national board examination. The Educational Commission for Foreign Veterinary Graduates (ECFVG) grants certification to individuals trained outside the U.S. who demonstrate that they meet specified requirements for the English language and clinical proficiency. ECFVG certification fulfills the educational requirement for licensure in all States except Nebraska. Applicants for licensure satisfy the examination requirement by passing the North American Veterinary Licensing Exam (NAVLE), which replaces the National Board Examination (NBE) and the Clinical Competency Test (CCT) as of April 2000. The new NAVLE, administered on computer, takes one day to complete and consists of 360 multiple-choice questions, covering all aspects of veterinary medicine. The NAVLE also includes visual materials designed to test diagnostic skills.

The majority of States also require candidates to pass a State jurisprudence examination covering State laws and regulations. Some States also do additional testing on clinical competency. There are few reciprocal agreements between States, making it difficult for a veterinarian to practice in a different State without first taking another State examination.

Thirty-nine States have continuing education requirements for licensed veterinarians. Requirements differ by State and may involve attending a class or otherwise demonstrating knowledge of recent medical and veterinary advances.

Most veterinarians begin as employees or partners in established practices. Despite the substantial financial investment in equipment, office space, and staff, many veterinarians with experience set up their own practice or purchase an established one.

Newly trained veterinarians can become U.S. Government meat and poultry inspectors, disease-control workers, epidemiologists, research assistants, or commissioned officers in the U.S. Public Health Service, U.S. Army, or U.S. Air Force. A State license may be required.

Prospective veterinarians must have good manual dexterity. They should have an affinity for animals and the ability to get along with animal owners. Additionally, they should be able to quickly make decisions in emergencies.

**Job Outlook**

Employment of veterinarians is expected to grow faster than the average for all occupations through the year 2008. Job openings stemming from the need to replace veterinarians who retire or otherwise leave the labor force will be almost as numerous as new jobs resulting from employment growth over the 1998-2008 period.

Most veterinarians practice in animal hospitals or clinics and care primarily for companion animals. The number of pets is expected to increase more slowly during the projection period than in the previous decade and may moderate growth in the demand for veterinarians who specialize in small animals. One reason for this is that the large baby-boom generation is aging and will probably acquire fewer dogs and cats than earlier. However, as non-necessity income generally increases with age, those who own pets may be more inclined to seek veterinary services. In addition, pet owners are becoming more aware of the availability of advanced care and may increasingly take advantage of nontraditional veterinary services, such as preventive dental care, and may more willingly pay for intensive care than in the past. Finally, new technologies and medical advancements should permit veterinarians to offer better care to animals. Veterinarians who enter small animal practice will probably face competition. Large numbers of new graduates continue to be attracted to small animal medicine because they prefer to deal with pets and to live and work near highly populated areas. However, an oversupply does not necessarily limit the ability of veterinarians to find employment or to set up and maintain a practice in a particular area. Such an oversupply could result in veterinarians taking positions requiring much evening or weekend work to accommodate the extended hours of operation that many practices are offering. Others could take salaried positions in retail stores offering limited veterinary services. Most self-employed veterinarians will probably have to work hard and long to build a sufficient clientele.

The number of jobs for large animal veterinarians is expected to grow slowly, because productivity gains in the agricultural production industry mean demand for fewer veterinarians than before to treat food animals. Nevertheless, job prospects may be better for veterinarians who specialize in farm animals than for small animal practitioners, because most veterinary medical college graduates do not have the desire to work in rural or isolated areas.

Continued support for public health and food safety, disease control programs, and biomedical research on human health problems will contribute to the demand for veterinarians, although such positions are few in number. Also, anticipated budget tightening in the Federal Government may lead to low funding levels for some programs, limiting job growth. Veterinarians with training in public health and epidemiology should have the best opportunities for a career in the Federal Government.

**Earnings**

Median annual earnings of veterinarians were $50,950 in 1998. The middle 50 percent earned between $39,580 and $78,670. The lowest 10 percent earned less than $31,320 and the highest 10 percent earned more than $106,370.

Average starting salaries of 1998 veterinary medical college graduates varied by type of practice, as indicated by table 1.

**Table 1. Average starting salaries of veterinary medical college graduates, 1998**

| *Type of practice* | |
|---|---|
| Large animal, exclusive | $37,200 |
| Large animal, predominant | 37,500 |
| Mixed animal | 35,900 |
| Small animal, exclusive | 37,600 |
| Small animal, predominant | 36,300 |
| Equine | 29,200 |

SOURCE: American Veterinary Medical Association

New veterinary medical college graduates who enter the Federal Government usually start at $37,700. Beginning salaries were slightly higher in selected areas where the prevailing local pay level was higher. The average annual salary for veterinarians in the Federal Government in nonsupervisory, supervisory, and managerial positions was $61,600 in 1999.

**Related Occupations**
Veterinarians prevent, diagnose, and treat diseases, disorders, and injuries in animals. Those who do similar work for humans include chiropractors, dentists, optometrists, physicians, and podiatrists. Veterinarians have extensive training in physical and life sciences, and some do scientific and medical research, closely paralleling occupations such as biological, medical, and animal scientists.

Animal trainers, animal breeders, and veterinary technicians work extensively with animals. Like veterinarians, they must have patience and feel comfortable with animals. However, the level of training required for these occupations is substantially less than that needed by veterinarians.

**Sources of Additional Information**
For more information on careers in veterinary medicine and a list of U.S. schools and colleges of veterinary medicine, send a letter-size, self-addressed, stamped envelope to:

☛ American Veterinary Medical Association, 1931 N. Meacham Rd., Suite 100, Schaumburg, IL 60173-4360.

For information on scholarships, grants, and loans, contact the financial aid officer at the veterinary schools to which you wish to apply.

For information on veterinary education, write to:

☛ Association of American Veterinary Medical Colleges, 1101 Vermont Ave. NW., Suite 710, Washington, DC 20005.

For information on the Federal agencies that employ veterinarians and a list of addresses for each agency, write to:

☛ National Association of Federal Veterinarians, 1101 Vermont Ave. NW., Suite 710, Washington, DC 20005.

# Health Assessment and Treating Occupations

## Dietitians and Nutritionists

(O*NET 32521)

### Significant points

- Employment of dietitians is expected to grow about as fast as the average for all occupations through the year 2008 due to increased emphasis on disease prevention by improved health habits.
- Dietitians and nutritionists need at least a bachelor's degree in dietetics, foods and nutrition, food service systems management, or a related area.

**Nature of the Work**
Dietitians and nutritionists plan food and nutrition programs and supervise the preparation and serving of meals. They help prevent and treat illnesses by promoting healthy eating habits, scientifically evaluating clients' diets, and suggesting diet modifications, such as less salt for those with high blood pressure or reduced fat and sugar intake for those who are overweight.

Dietitians run food service systems for institutions such as hospitals and schools, promote sound eating habits through education, and conduct research. Major areas of practice are clinical, community, management, research, business and industry, and consultant dietetics.

*Clinical dietitians* provide nutritional services for patients in institutions such as hospitals and nursing homes. They assess patients' nutritional needs, develop and implement nutrition programs, and evaluate and report the results. They also confer with doctors and other health care professionals in order to coordinate medical and nutritional needs. Some clinical dietitians specialize in the management of overweight patients, care of the critically ill, or of renal (kidney) and diabetic patients. In addition, clinical dietitians in nursing homes, small hospitals, or correctional facilities may also manage the food service department.

*Community dietitians* counsel individuals and groups on nutritional practices designed to prevent disease and promote good health. Working in places such as public health clinics, home health agencies, and health maintenance organizations, they evaluate individual needs, develop nutritional care plans, and instruct individuals and their families. Dietitians working in home health agencies provide instruction on grocery shopping and food preparation to the elderly, individuals with special needs, and children.

Increased interest in nutrition has led to opportunities in food manufacturing, advertising, and marketing, in which dietitians analyze foods, prepare literature for distribution, or report on issues such as the nutritional content of recipes, dietary fiber, or vitamin supplements.

*Management dietitians* oversee large-scale meal planning and preparation in health care facilities, company cafeterias, prisons, and schools. They hire, train, and direct other dietitians and food service workers; budget for and purchase food, equipment, and supplies; enforce sanitary and safety regulations; and prepare records and reports.

*Consultant dietitians* work under contract with health care facilities or in their own private practice. They perform nutrition screenings for their clients, and offer advice on diet-related concerns such as weight loss or cholesterol reduction. Some work for wellness programs, sports teams, supermarkets, and other nutrition-related businesses. They may consult with food service managers, providing expertise in sanitation, safety procedures, menu development, budgeting, and planning.

**Working Conditions**
Most dietitians work a regular 40-hour week, although some work weekends. Many dietitians work part time.

Dietitians and nutritionists usually work in clean, well-lighted, and well-ventilated areas. However, some dietitians work in warm, congested kitchens. Many dietitians and nutritionists are on their feet for most of the workday.

**Employment**
Dietitians and nutritionists held about 54,000 jobs in 1998. Over half were in hospitals, nursing homes, or offices and clinics of physicians.